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4 May 1965

MEMORANDUM FOR THE RECORD

SUBJECT: Trip Report, 26-29 April 1965

1. Purpose of Trip - The purpose of the trip was two-fold. One objective was to make a survey of the "O" vehicle as it affects the location of the IR Launch Detector. The second objective of the trip was to solicit a proposal for a "rear view mirror" (tail warning device) for the "I" vehicle. A third contact supplemented the above activity. Aerojet General contacted the writer at his motel and asked that a short meeting be held regarding their feasibility study concerning their "rear view mirror" proposal effort.

2. Vehicle Survey - In regard to the vehicle survey, it is felt that very careful layout and location of the IR Sensor head will be required in order to completely cover the threat envelope. Information gathered tends to indicate that it may be difficult to mount the scanner in the "Q" bay cover because of SIP and camera configurations. The "Q" bay cover is an ideal location for the scanner, and would enable complete threat zone coverage beyond any doubt. Placement of the scanner in a chine area may pose "look" problems as well as possible background noise problems at the extreme of a scan. The flatest portion of the lower fuselage chine area, with respect to the water line, is 17° and the attack angle is about 7° . This comes close to the IR field of view at the extreme scan. It is felt that it is only proper to expedite program clearances of cognizant Aerojet personnel, so they may perform a detailed layout of the system prior to contract negotiation.

3. Rear View Mirror - Hughes was contacted on 28 April regarding a proposal effort on this device for

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Page 2

the "I" vehicle. The threat problem was presented in terms of detecting a hostile fighter executing a tail chase. The weapons threat being an air-to-air missile. Indication of angle, range, and, if practical, range rate should be presented. Detection capability to about 20 n.m. was given as a criteria. [] indicated that he was aware of the need for such a warning device and presented system parameters of their "Swiss Taran" search/track radar. The radar could provide the functions necessary, and more, but it has definite drawbacks in regard to the "I" vehicle. These drawbacks are:

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- a. Dish size (18 inches)
- b. Weight (320 lbs., less indicator)

The system operates in X-band. [] indicated they will review the problem and try to optimize a detection device (radar, IR, or laser).

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4. Time Code Generator - Two time code generators, cable harness and battery pack were picked up at LAC, Van Nuys, at the request of Headquarters. LAC indicated they had obtained necessary data from these units.

5. Rear View Mirror - Aerojet General - A call was received from Aerojet General on 28 April requesting a short meeting concerning their investigation into this problem. Their approach utilizes IR detection. At the meeting, they presented their method of target scaling, the attenuation model, detector sizing, detector detectivity considerations, and gross requirements in regard to scanner/vehicle mechanical interface. Target scaling was based on the NOTS work with the F104. The MIG-21 is considered to be a slightly colder target than the 104, by OSI. Scaling shows that adequate signal threshold can be obtained in both the 3 micron and 4 micron region peaks of the spectra. The levels are adequate to provide detection of the target at approximately 20 n.m. minimum. Their present opinion is that an array of lead selenide detectors, cooled to -40 degrees, and operating

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BYE-41932-65
Page 3

in the 4 micron region has a better advantage than the lead sulphide detector operating in the 3 micron region, even though the specific detectivity of Lead Selenide is less. In order to obtain the necessary field of coverage, a 6 bar scan would be required. They will go through an analysis to obtain rate and/or ranging data in the immediate future. It was suggested that possibly a laser ranging device coupled to an IR head for pointing data could be used. Aerojet has developed such a system, which uses a pulsed laser. They feel that a significant weight reduction can be made by using a relatively new CW laser. The existing pulsed laser system has capability to about 16 miles.

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2 - MD/OSA
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